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# Biofuel Policy and Drought Impacts on the U.S. Grain and Livestock Markets

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# CORNHUSKER ECONOMICS

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Lincoln

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Institute of Agriculture & Natural Resources  
Department of Agricultural Economics  
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## Biofuel Policy and Drought Impacts on the U.S. Grain and Livestock Markets<sup>1</sup>

Market Report	Yr Ago	4 Wks Ago	9/6/13
<b><u>Livestock and Products,</u></b>			
<b><u>Weekly Average</u></b>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight. . . . .	\$123.02	\$123.34	\$123.34
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb. . . . .	166.60	175.31	185.51
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb. . . . .	148.03	163.63	164.44
Choice Boxed Beef, 600-750 lb. Carcass. . . . .	190.97	187.92	195.94
Western Corn Belt Base Hog Price Carcass, Negotiated. . . . .	65.62	98.51	89.76
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean. . . . .	79.39	104.22	94.69
Slaughter Lambs, Ch. & Pr., Heavy, Woolled, South Dakota, Direct. . . . .	98.00	118.00	108.00
National Carcass Lamb Cutout, FOB. . . . .	313.79	273.11	282.56
<b><u>Crops,</u></b>			
<b><u>Daily Spot Prices</u></b>			
Wheat, No. 1, H.W. Imperial, bu. . . . .	8.29	6.78	6.64
Corn, No. 2, Yellow Nebraska City, bu. . . . .	7.97	5.71	5.53
Soybeans, No. 1, Yellow Nebraska City, bu. . . . .	17.17	12.82	14.78
Grain Sorghum, No. 2, Yellow Dorchester, cwt. . . . .	13.18	9.04	8.36
Oats, No. 2, Heavy Minneapolis, MN, bu. . . . .	4.18	3.92	3.44
<b><u>Feed</u></b>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton. . . . .	242.50	245.00	242.50
Alfalfa, Large Rounds, Good Platte Valley, ton. . . . .	212.50	165.00	110.00
Grass Hay, Large Rounds, Good Nebraska, ton. . . . .	160.00	160.00	117.50
Dried Distillers Grains, 10% Moisture, Nebraska Average. . . . .	300.00	214.25	214.00
Wet Distillers Grains, 65-70% Moisture, Nebraska Average. . . . .	119.00	77.00	80.00
<b>*No Market</b>			

With the rapid increase in the production of biofuels in the United States, especially corn based ethanol, the ethanol industry has emerged as the livestock and poultry industry's largest single competitor for corn, the predominant source of feed for cattle, hogs and poultry. As a consequence of this competition, corn prices have dramatically increased. Higher corn prices affect profitability of the livestock and poultry enterprises, as 60 to 70 percent of their variable costs are feed costs. Ethanol production, however, also has a positive effect on livestock production in the form of distiller grains (DG). DG is a by-product of ethanol production and is increasingly used in animal feeds. This fact helps to partially offset the effect of higher corn prices on livestock and poultry production.

The ethanol mandate (hereafter the mandate), obligates fuel producers to blend certain volumes of ethanol into gasoline annually, and is a major driver of corn demand. For example, the 2013 year mandate required 13.8 billion gallons of ethanol be blended into gasoline. This amount will increase to 15 billion gallons by the year 2015. Currently, about ten percent of the total amount of gasoline consumed in the United States is ethanol.

Drought events such as the one last year have a detrimental impact on livestock and poultry production. Such drought impacts are amplified in the presence of the ethanol mandate. It was the anticipated negative effects of the 2012 drought that led governors from livestock producing states to petition the Environmental Protection Agency (EPA) to issue a partial waiver of the mandate for the years 2012 - 2013. However, given the current economic incentives to blend ethanol with gasoline, the requested man-

<sup>1</sup> This article is based on a study "Estimating the Impact of Biofuel Policy and Drought on the U.S. Grain and Livestock Markets Using a Stochastic Multi-market Equilibrium Displacement Model." We do not provide here the details on the methods or references used in this study. Interested readers are advised to contact the authors.



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date waiver was denied. The reason the EPA did not grant the mandate waiver is likely due to the fact that some believe granting the waiver would not lead to a major reduction in ethanol consumption, and hence, to a lesser demand for corn for ethanol production.

Without a waiver, ethanol blenders can only blend lesser volumes of ethanol than required by the mandate by using Renewable Fuels Identification Number (RIN) credits. RINs are the credits given to blenders by the EPA for each gallon of renewable fuel blended with gasoline. If more gallons of ethanol are blended than required by the mandate, these extra gallons are carried forward as credits to be used in the future. This means that the mandate for any particular year can be fulfilled by actual gallons blended and RIN credits from previous years. At the end of last year, about 1.9 billion gallons of RIN credits were available to be used.

We recently investigated how the drought changes corn prices due to the combined effect of the mandate and RIN credits; which in turn impacts the livestock industry. The specific objectives of the study are twofold: 1) to measure the impact of the mandate on the livestock and poultry industries in the presence of a drought-induced crop and pasture shortfall, using the 2012 drought as a case study, and 2) to estimate the mandate waiver required to fully offset the impact of drought on corn prices. For methodology, we developed a stochastic equilibrium displacement model that accounts for linkages between eight markets: beef, pork, poultry, corn, soybean, soymeal, DG and ethanol markets.

Figure 1 (on next page) compares the drought impact on grain and livestock prices with and without the use of RIN credits.<sup>2</sup> Among meat markets, the impact of drought is higher on beef compared to pork and poultry. Drought increases retail beef prices by 8.3 percent with the use of all RIN credits and 8.5 percent without the credits; compared to 2.5 and 2.9 percent, respectively, for pork, and 4.5 and 5 percent, respectively, for poultry. The higher impact on retail beef prices is to be expected, considering the dual impact of drought on feed and forage prices, while changes in retail pork and poultry prices are affected only by changes in feed prices. The largest impact of drought is on grain markets, particularly corn. The price of corn increases by 31.9 percent with the use of all RIN credits and 40.2 percent without. The impacts in percent on other prices with and without RIN credits are as follows: soybeans, 24.3 and 24.9 percent; soymeal, 14.6 and 16.4 percent; DG, 9.7 and 11.7 percent; and ethanol, -9.10 and 4.9 percent. Since grain production is the primary industry affected by drought, and the impact on meat and feed markets are transmitted through grain mar-

kets, the higher impact of drought on corn and soybean prices compared to meat and feed prices is not surprising.

The use of RIN credits is shown to help considerably in reducing the negative impact on the price of corn. The increase in the price of corn with RIN credits is about 8.3 percentage points lower than without the credits. Similarly, the use of RIN credits has a significant impact on the price of ethanol. With the use of the RIN credits, the price of ethanol decreases by 9.10 percent and without credits increases by 4.9 percent. The use of RIN credits, however, does not translate into a significant impact on meat markets, as the difference in impacts are less than a percentage point for all three types of meats.

The mandate waiver required to fully offset the impact of the 2012 drought on the price of corn, i.e., leave the price of corn at its pre-drought level, is estimated to be 64 percent. This translates into about a 39 percent decrease in ethanol usage.<sup>3</sup> Our model predicts that on average, the price of corn declines by 2.68 percent for a one percent decrease in rainfall, and by 0.6 percent for a one percent decrease in mandate. Therefore, to fully offset the effect of drought requires a 4.8 percent waiver in the mandate for each one percent decline in rainfall.

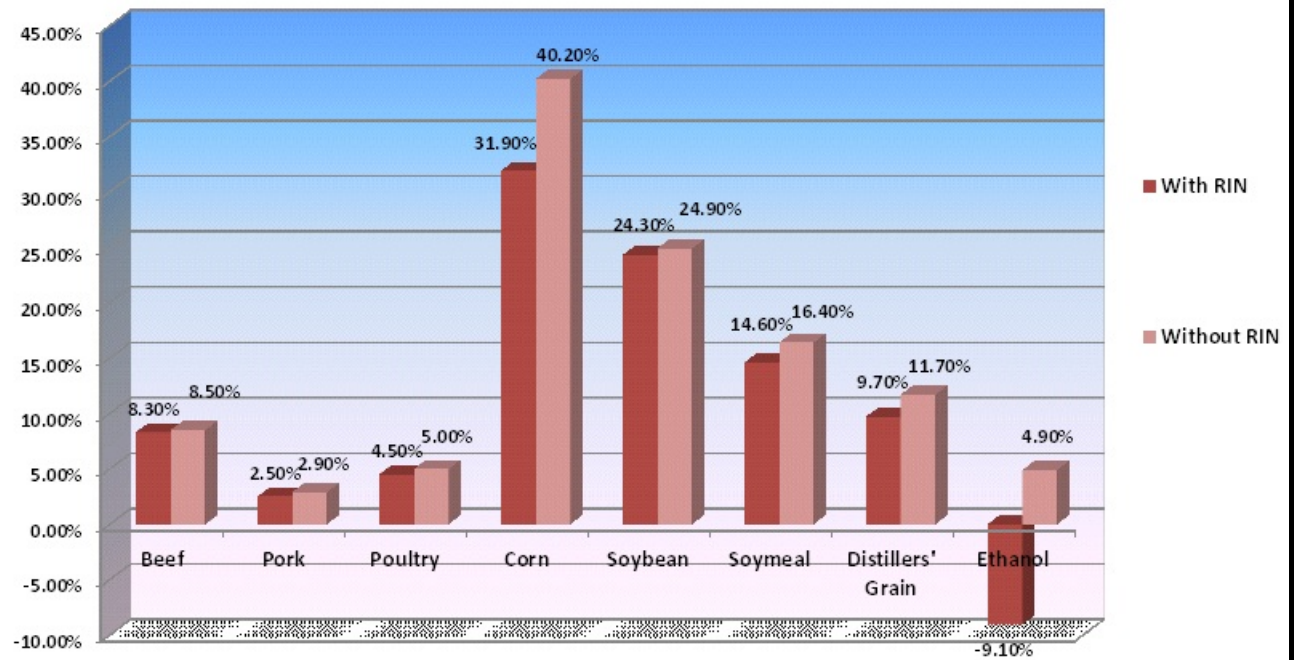
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<sup>2</sup> Drought is measured as a 15 percent deficit in rainfall relative to the 11-year average U.S. rainfall.

<sup>3</sup> This result is of theoretical interest only, since in practice it may not be a feasible option considering the environmental concern imbedded in the biofuels policy.



**Figure 1: Impact of Drought on Grain and Livestock Prices  
With and Without Use of RIN Credits**